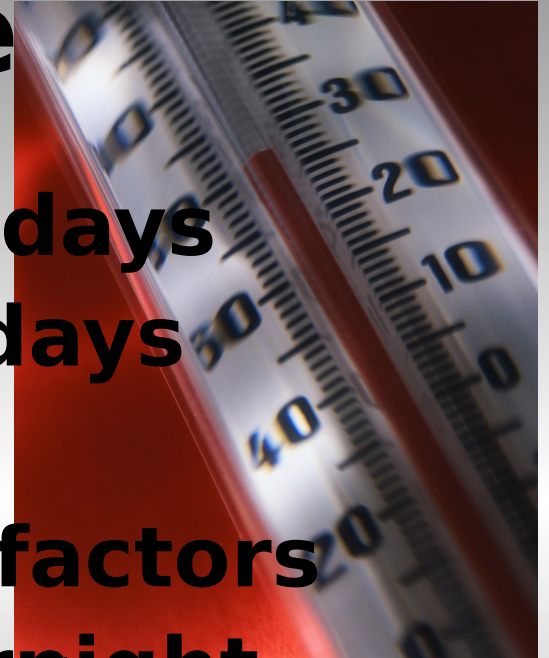


# **Heat Injury Prevention & Treatment**



# Heat Injury Hazards are Cumulative

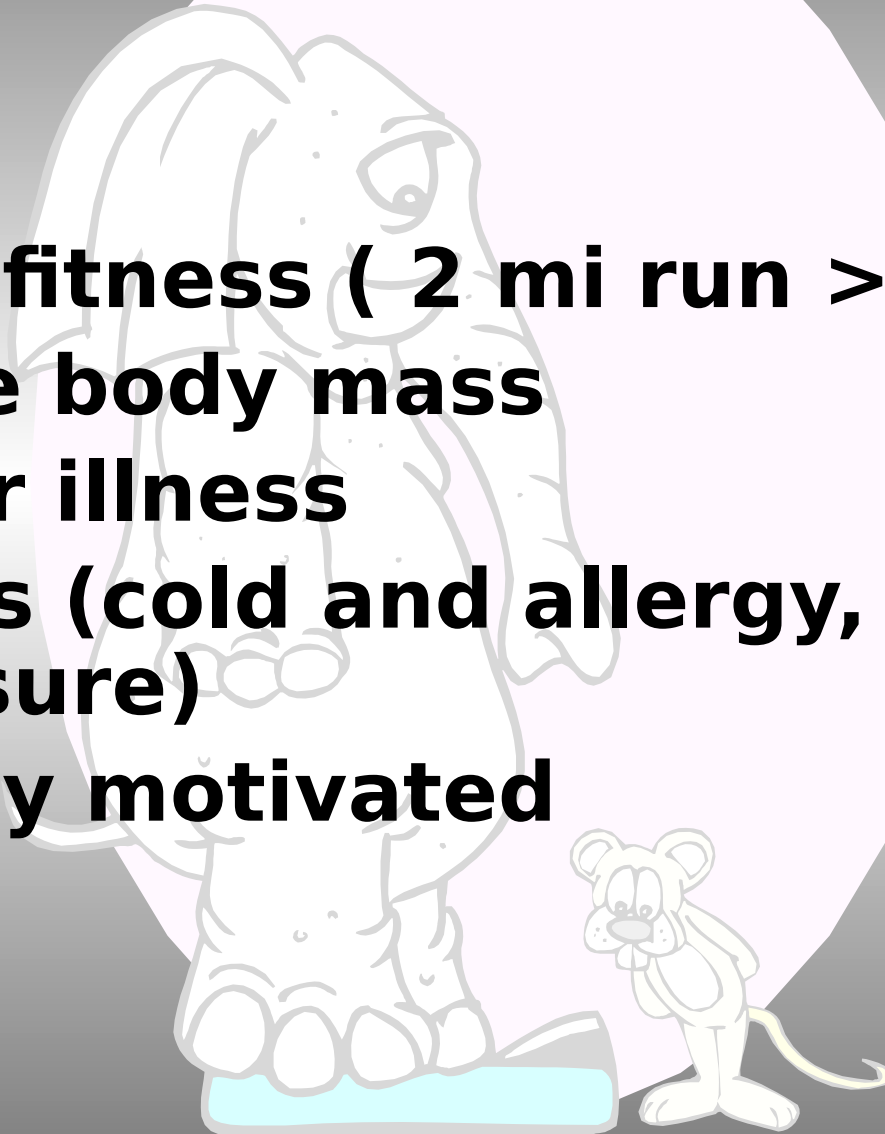
- H- Heat category past 3 days
- E- Exertion level past 3 days
- A- Acclimation/  
other individual risk factors
- T- Temperature/rest overnight



**Cluster of heat injuries on prior  
days= HIGH RISK**

# Individual Risk Factors

- **Poor fitness ( 2 mi run > 16 min)**
- **Large body mass**
- **Minor illness**
- **Drugs (cold and allergy, blood pressure)**
- **Highly motivated**



# Individual Risk Factors

- **Supplements- ephedra**
- **Recent alcohol use**
- **Prior heat injury**
- **Skin problems- rash, sunburn, poison ivy**
- **Age > 40**



# **Risk Mitigation**

## **Avoid Heat Loading**

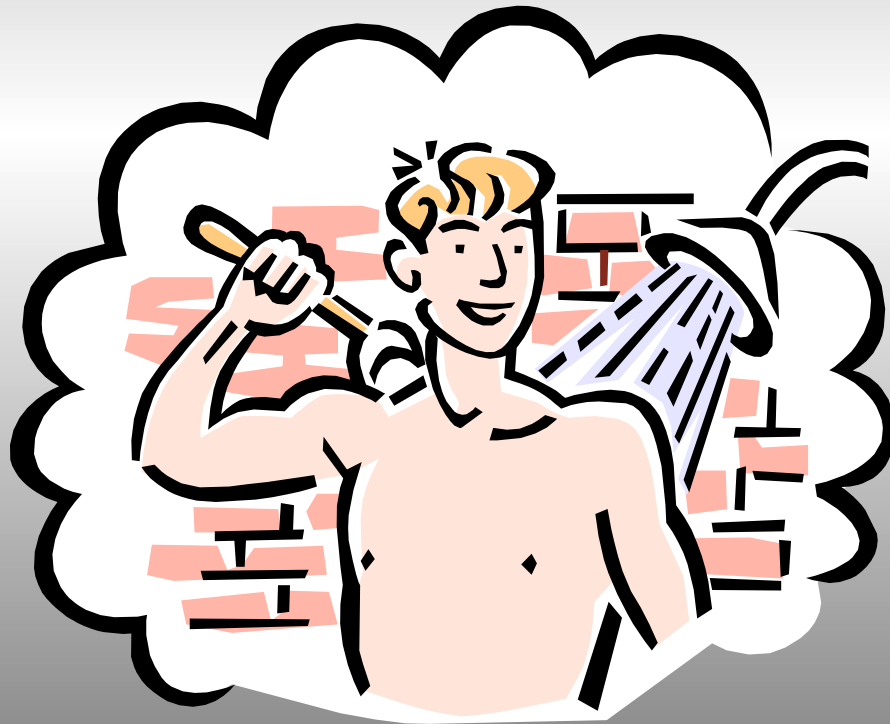
- **Modify schedule- time of day, rest**
- **Clothing-  
Loose layers**
- **Formations:**
  - **Wide spacing**
  - **Shade soldiers**
- **Cumulative- avoid strenuous back-to-back events**



# **Risk Mitigation**

## **Dump Heat Load**

- **Cool overnight temp**
- **Cold showers**



# Develop Controls

- Track Wet Bulb Globe Temp (WBGT)
- Track hydration of Soldiers
- Fluid replacement/ work/ rest guidelines
- Keep urine lemonade color (light yellow)



- All unit leaders must be familiar with heat injury prevention and recognition
- Know the Soldiers who are high risk
- Ensure water points accessible/ utilized



# Symptoms of Mild Injury

- Dizziness
- Headache
- Nausea
- Unsteady walk
- Weakness
- Muscle cramps
- These folks need rest, water, evaluation
- These are your  
“canaries in the mine”





# Mild Heat Injury Management



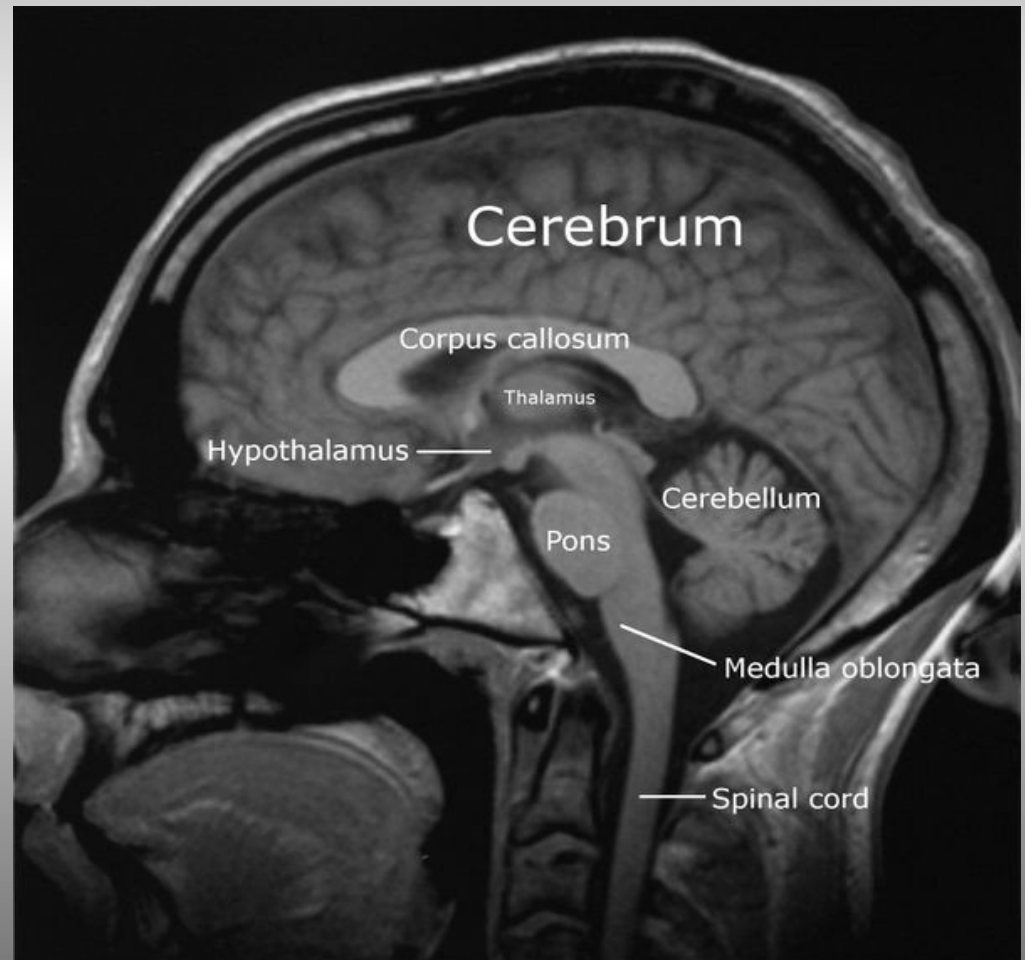
- Rest Soldier in shade
- Loosen uniform/ remove head gear
- Have Soldier drink 2 quarts of water over 1 h



- Evacuate if no improvement in 30 min, or if Soldier's condition worsens

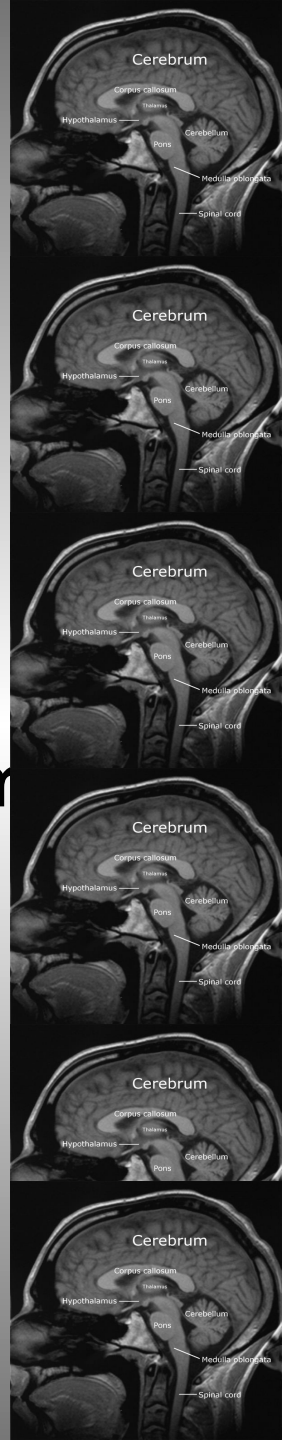
# Heat Stroke

- Abnormal brain function- elevated body temperature
- Examples:
  - Confused
  - Combative
  - Passed out
  - Sudden death



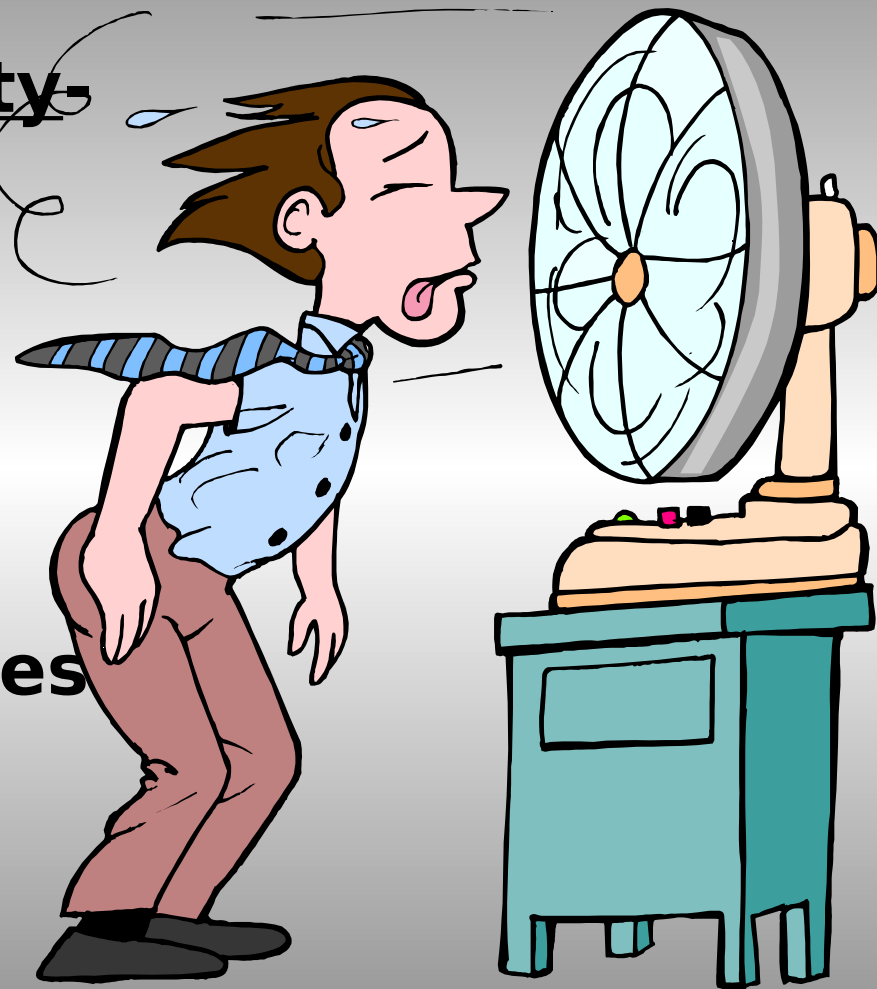
# Heat Stroke

- When a soldier's brain isn't working correctly- **COOL and CALL**
- Treat any soldier who develops abnormal brain function during warm weather activity as a **heat stroke victim**
- The sooner a victim with heat stroke is cooled, the less damage will be done to his **brain and** **s**



# Pre-Hospital Care

- Cooling is first priority-  
can reduce mortality  
from 50% to 5%
- Drench with water
- Fan
- Iced sheets
- Massage large muscles  
while cooling
- Stop if shivering  
occurs



# Work/Rest and Water Consumption Table

Applies to average sized, heat-acclimated soldier wearing BDU, hot weather. (See TB MED 507 for further guidance.)

Easy Work	Moderate Work	Hard Work
<ul style="list-style-type: none"> <li>• Weapon Maintenance</li> <li>• Walking Hard Surface at 2.5 mph, &lt; 30 lb Load</li> <li>• Marksmanship Training</li> <li>• Drill and Ceremony</li> <li>• Manual of Arms</li> </ul>	<ul style="list-style-type: none"> <li>• Walking Loose Sand at 2.5 mph, No Load</li> <li>• Walking Hard Surface at 3.5 mph, &lt; 40 lb Load</li> <li>• Calisthenics</li> <li>• Patrolling</li> <li>• Individual Movement Techniques, i.e., Low Crawl or High Crawl</li> <li>• Defensive Position Construction</li> </ul>	<ul style="list-style-type: none"> <li>• Walking Hard Surface at 3.5 mph, ≥ 40 lb Load</li> <li>• Walking Loose Sand at 2.5 mph with Load</li> <li>• Field Assaults</li> </ul>

- The work/rest times and fluid replacement volumes will sustain performance and hydration for at least 4 hrs of work in the specified heat category. Fluid needs can vary based on individual differences ( $\pm \frac{1}{4}$  qt/hr) and exposure to full sun or full shade ( $\pm \frac{1}{4}$  qt/hr).

• NL = no limit to work time per hr.

• Rest = minimal physical activity (sitting or standing) accomplished in shade if possible.

• **CAUTION:** Hourly fluid intake should not exceed  $1\frac{1}{2}$  qts.

Daily fluid intake should not exceed 12 qts.

• If wearing body armor, add 5°F to WBGT index in humid climates.

• If doing Easy Work and wearing NBC (MOPP 4) clothing, add 10°F to WBGT index.

• If doing Moderate or Hard Work and wearing NBC (MOPP 4) clothing, add 20°F to WBGT index.

Heat Category	WBGT Index, F°	Easy Work		Moderate Work		Hard Work	
		Work/Rest (min)	Water Intake (qt/hr)	Work/Rest (min)	Water Intake (qt/hr)	Work/Rest (min)	Water Intake (qt/hr)
1	78° - 81.9°	NL	$\frac{1}{2}$	NL	$\frac{3}{4}$	40/20 min	$\frac{3}{4}$
2 (GREEN)	82° - 84.9°	NL	$\frac{1}{2}$	50/10 min	$\frac{3}{4}$	30/30 min	1
3 (YELLOW)	85° - 87.9°	NL	$\frac{3}{4}$	40/20 min	$\frac{3}{4}$	30/30 min	1
4 (RED)	88° - 89.9°	NL	$\frac{3}{4}$	30/30 min	$\frac{3}{4}$	20/40 min	1
5 (BLACK)	> 90°	50/10 min	1	20/40 min	1	10/50 min	1

For additional copies, contact: U.S. Army Center for Health Promotion and Preventive Medicine Health Information Operations Division at (800) 222-9698 or CHPPM - Health Information Operations@apg.amedd.army.mil.  
For electronic versions, see <http://chppm-www.apgea.army.mil/heat>. Local reproduction is authorized.  
June 2004



# HEAT INJURY PREVENTION

## Fluid Replacement Guidelines for Warm Weather Training

(Applies to average heat acclimated soldier wearing BDU, Hot Weather)

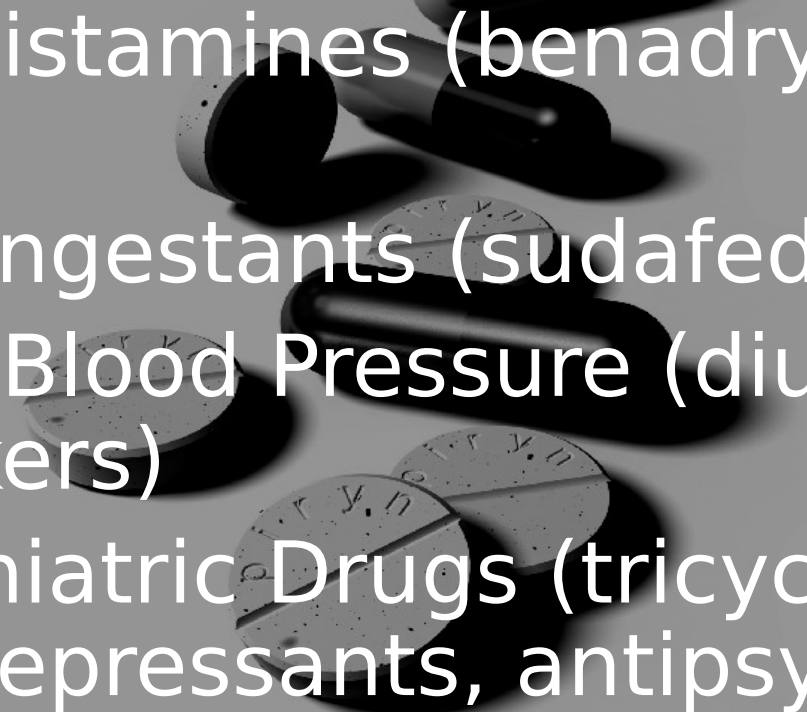
Heat Category	WBGT Index, °F	Easy Work		Moderate Work		Hard Work	
		Work/Rest	Water Intake, Qt/hr	Work/Rest	Water Intake, Qt/hr	Work/Rest	Water Intake, Qt/hr
1	78-81.9	NL	1/2	NL	3/4	40/20 min	3/4
2 (Green)	82-84.9	NL	1/2	50/10 min	3/4	30/30 min	1
3 (Yellow)	85-87.9	NL	3/4	40/20 min	3/4	30/30 min	1
4 (Red)	88-89.9	NL	3/4	30/30 min	3/4	20/40 min	1
5 (Black)	>90	50/10 min	1	20/40 min	1	10/50 min	1



- The work rest times and fluid replacement volumes hydration volumes will sustain performance for at least 4 hours of work in the specified heat category. Individual water needs will vary approx 1/4 qt or 8 ounces per hour.
- NL=no limit to work time per hour.
- Rest means minimal physical activity (sitting or standing), accomplished in shade if possible.
- **CAUTION: Hourly fluid intake should not exceed 1<sup>1/2</sup> quarts.**  
**Daily fluid intake should not exceed 12 quarts.**
- Wearing body armor adds 5 degrees Fahrenheit to WBGT Index
- Wearing MOPP overgarment add 10 degrees Fahrenheit to WBGT Index.

# Drugs that Interfere with

## Heat Regulation

- Antihistamines (benadryl, atarax, ctm)
  - Decongestants (sudafed)
  - High Blood Pressure (diuretics, beta blockers)
  - Psychiatric Drugs (tricyclic antidepressants, antipsychotics)
- 



# **Scenario**

## **Awake Victim- Muscle Cramps/Headache**

- **Move to shade/ or air conditioning**
- **Remove outer layer of clothing/ headgear**
- **2 canteens of water over 1 hour**



# **Scenario**

## **Awake Victim- Abnormal Behavior**

- **Move to shade**
- **Remove outer layer of clothing**
- **Call for evacuation**
- **Begin rapid cooling- iced sheets**
- **CLS qualified individuals may administer an IV after evacuation and cooling started**

# Water Intoxication

- Do not “Force Hydration”
- Mental status changes
- Vomiting
- History of large volume of water consumed
- Poor food intake
- Abdomen distended/bloated
- Copious clear urine